Identification and control of brome grasses

Significance as weeds
The five species of brome grasses that grow as arable weeds in the UK belong to one of two groups. All can reduce yield and quality. As different control measures apply to each group identification is important. Species are easier to identify once seed heads are visible, usually June/July but not before.

Brome grasses have become more widespread in arable rotations for a range of reasons, including: greater use of non-inversion and shallow cultivations, straw incorporation, early sowing (September), continuous winter cereals, poor inversion ploughing, contaminated machinery, short or little dormancy, bare patches in hedge bases or field boundaries, over-reliance on herbicides alone, contaminated manures and feeding contaminated hay in-field.

In contrast, incidence may be reduced by: good ploughing, late sowing (November), break crops in the rotation, spring cropping, cleaning machinery between fields and stale seedbeds.

The significance of the above factors varies with species. At high populations all species, especially barren (sterile) and great brome, can slow harvesting.

Biology
Most populations of all species have weak and/or short-lived initial dormancy when seed is shed. Some with stronger initial dormancy have extended seedling emergence (Figure 1).

Figure 1. Aspects of weed development vary between the two species groups

<table>
<thead>
<tr>
<th>Anisantha species – barren and great brome</th>
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<tbody>
<tr>
<td>Flowering</td>
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<tr>
<td>Seed shed</td>
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<td>Emergence</td>
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<th>Bromus species – meadow, soft and rye brome</th>
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* Soft brome only - flowers slightly earlier than meadow brome.

Although very few seeds (less than 1%) may become dormant, dormant seed surviving on or in soil can guarantee some survival from year to year.

Most seeds of all species will germinate when moist, either in the soil or on the surface in chopped straw.

Key points
Map brome patches in June/July. Identify brome to group or species and plan management accordingly.

Minimise weed seed spread at harvest or during cultivations.

Adopt zero tolerance in seed – certified or farm-saved.

Integrate cultural and chemical weed control.

Plough badly infested fields at least on a rotational basis.

Make best use of stale seedbeds and use glyphosate pre-drilling; if necessary, delay drilling or introduce spring cropping.

Increase seed rates to maximise crop competition.

Include break crops in rotation to extend control options.

Mow field edges before panicles emerge.

Always consider your local conditions and consult a BASIS-qualified adviser if necessary.
**Anisantha species**

**Barren or sterile brome**
*Anisantha sterilis*

Very competitive – 10 plants/m² causes 8% yield loss in winter wheat

Awns 15–30mm

**Great brome**
*Anisantha diandrus*

3 plants/m² can cause up to 2% yield loss in winter wheat

Awns 35–60mm

The two *Anisantha* species have long awns and loose floppy panicles

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**Bromus species**

**Meadow brome**
*Bromus commutatus*

3 plants/m² can cause up to 2% yield loss in winter wheat

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**Soft brome**
*Bromus hordeaceuous*

3 plants/m² can cause up to 2% yield loss in winter wheat

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**Rye brome**
*Bromus secalinus*

Competitive – 250 plants/m² can cause up to 40% yield loss in winter wheat at high densities

The three *Bromus* species have short awns and tighter neater panicles

See www.hgca.com/awe for more images and information
Cultural control

Preventing seed spread

Most infestations begin in headlands and field margins. Cultivating close to the boundary drags seed further into the field. Harvest and subsequent cultivations can move seed up to 50m.

Brome can be introduced via contaminated seed, feeding contaminated hay in the field or by spreading contaminated manure. *Bromus* species ripen later than *Anisantha* species and any straw removed may contain substantial quantities of viable *Bromus* seed.

Using the whole rotation

A non-cereal break crop enables use of a wider range of herbicides (Table 2).

A spring crop allows stale seedbed or fallow techniques and encourages germination. Seedlings can be killed using a non-selective herbicide pre-drilling.

Use of glyphosate is very effective in fallow breaks.

Maximising seed loss pre-drilling

In both *Anisantha* and *Bromus* species, seeds buried by ploughing to 15cm depth cannot emerge so ploughing provides effective control. However, high levels of brome are difficult to bury as seeds clump together and can be flicked up during ploughing onto freshly ploughed land. Slow ploughing results in better burial. Annual ploughing can be effective (Figure 2) but a small proportion of seeds can survive at plough depth from one autumn to the next.

Early drilling – before germination of brome – results in weeds in the crop; delayed drilling significantly improves control.

Wait for a flush of weeds before drilling.

Managing field margins

Bromes quickly colonise bare patches in hedge bottoms or field boundaries. Sow a perennial grass mixture in these areas to prevent bromes establishing.

Mow bromes within 2–6 days of flowering to prevent viable seed forming (April onwards). Ideally mow before the panicle begins to emerge. Mowing is permitted under cross compliance at any time; cutting before 1 March and after 31 July provides reasonable control but avoids bird nesting.

Cultivating, or spraying off, a strip between crop and margin initially reduces populations but provides area for new seeds to germinate. Do not use uncultivated strips where brome is confined to field margins. Avoid herbicide spray drift into margins as this creates bare patches.

Soft and barren brome can survive in field boundary swards with perennial grasses; mow to prevent seeding.

Ploughing the outer few metres of a field at the first signs of infestation could help minimise risk of spread.

Chemical and cultural control should be integrated to provide an effective weed control strategy.

Anisantha species

Exposure to light induces dormancy (seed survives for up to two years).

- Plough for good control.
- Shallow cultivate to bury seeds as soon as possible after harvest and encourage germination – unless chopped straw provides good seed cover.
- Spray off with glyphosate pre-drilling.
- Delay drilling to significantly improve control.
- Wait for a weed flush, in dry periods, before drilling.

Bromus species

At harvest, seeds are usually under-ripe. Seed burial immediately after harvest enforces dormancy in some seeds and so increases seed survival.

- Leave seeds to ripen on soil surface for one month before cultivating.
- Shallow cultivate, after a month, to place seeds in moisture; then spray off emerged weeds with glyphosate.

Figure 2. Effect of delaying cultivation and cultivation depth on barren brome panicle number

![Figure 2](image-url)
**Chemical control**

A limited range of herbicides is available to control bromes in cereals (Table 1).

### Table 1. Herbicides for use in cereal crops

| Pre-emergence | \begin{tabular}{llll}
Active substance & Example product & Crops  \\
prosulfocarb & Defy & ww, wb, tr, sb, dw, sw  \\
flufenacet + diflufenican & Liberator & ww, wb, tr, dw  \\
flufenacet + pendimethalin & Crystal & ww, wb  \\
trilinate & Avadex & ww, wb, dw, tr  \\
\end{tabular} |
| Post-emergence (winter wheat only) | \begin{tabular}{llll}
Active substance & Application window & Brome GS  \\
pyroxsulam + florasulam & Broadway Star* & GS11-32 to GS24  \\
propyoxycarbazine-sodium & Attribut & 1 February – GS33 pre GS31  \\
sulfosulfuron & Monitor & 1 February – GS39 to GS32  \\
mesosulfuron-methyl + iodosulfuron-methyl-sodium & Pacifica & 1 February – GS39 to GS30–33  \\
\end{tabular} |

- A minimum 2-spray programme, including pre- and post-emergence, should be used. All post-emergence chemicals are ALS inhibitors. They can only be applied once in any programme; only pyroxsulam can be autumn applied.
- Apply glyphosate at up to the soft dough stage of bromes to ensure no fertile seed is set.
- There is no treatment for control of soft brome in spring barley.
- Brome control in cereals can be variable; it is often affected by growth and weather conditions.

**Always check product labels or with manufacturer for up-to-date recommendations. Use pesticides safely.**

For up-to-date information on Specific Off-Label Approvals (SOLAs) see: https://secure.pesticides.gov.uk/offlabels/search.asp

### Table 2. Combinable break crops allow wider range of herbicides

| Active ingredient & Combining peas & Linseed & Spring beans & Spring rape | Winter beans | Winter rape |
|------------------|-----------------|--------|-------------|--------------|-------------|-------------|
| carbetamide      & SOLA            &        |             |               |             |             |
| clomazone + metazachlor &            &        |             |               |             |             |
| cycloxydim       &                &        |             |               |             |             |
| dimethenamid-P + metazachlor + quinmerac &            &        |             |               |             |             |
| fluazifop-P-buty &                &        |             |               |             |             |
| metazachlor      & SOLA            &        |             |               |             |             |
| metazachlor + quinmerac & SOLA            &        |             |               |             |             |
| propaquizafop    &                &        |             |               |             |             |
| propyzamide      &                &        |             |               |             |             |
| prosulfocarb     &                &        |             |               |             |             |
| quinalofop-P-ethyl &                &        |             |               |             |             |
| quinalofop-P-tefur &                &        |             |               |             |             |
| tepraloxydim     &                &        |             |               |             |             |
| tri-allate       &                &        |             |               |             |             |

A wider range of herbicides is available for use in non-cereal break crops (Table 2).

**Further information**

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**Encyclopaedia of Arable Weeds**

HGCA/BASF (2009)  
www.hgca.com/awe

This Information Sheet collates data from a number of Defra and HGCA-funded R&D projects over several years.

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